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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,300	11/24/2003	Manish Gupta	YOR920030242US1	4126

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EXAMINER	
MEJIA, ANTHONY	

ART UNIT	PAPER NUMBER
4117	

NOTIFICATION DATE	DELIVERY MODE
10/15/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/720,300	GUPTA ET AL.	
	Examiner	Art Unit	
	Anthony Mejia	4117	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. **Claims 1, 3, and 7** are rejected under 35 U.S.C. 102(e) as being anticipated by Liang (US. 6,738,811) (referred hereafter as Liang).

Regarding **Claim 1**, Liang discloses a method of predicting (col. 2, lines 33-35) the occurrence of critical events in a computer cluster having a series of nodes (computing device, col. 2, lines 1-2), said method comprising:

maintaining an event log (historic data, col. 2, lines 21-33) that contains information concerning critical events that have occurred in the computer cluster (e.g. critical event when a parameter is off a predefined range, col. 6, lines 37-41);

maintaining a system parameter log (list 300, which includes parameters, 304, device info, 306) that contains information concerning system parameters for each node in the cluster (col. 6, lines 15-24);

predicting a future performance parameter of a node in the cluster based upon said event log and said parameter log (col. 2, lines 43-49).

Regarding **Claim 3**, Liang discloses wherein maintaining said system parameter log comprises recording a temperature of a node in the cluster and a corresponding time value (Fig. 6, & col. 8, lines 13-20).

Regarding **Claim 7**, Liang discloses wherein comprising using a rule based classification system to predict future critical events based upon said critical event information and said system parameter information (col. 8, lines 21-22, lines 33-35, col. 8, lines 1-13, Fig. 5, elements 504 & 510).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 2, 5-6, 17-18, and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Liang in view of Chirashnya et al. (US. 2002/0019870) (referred herein after as Chirashnya)

Regarding **Claim 2**, Liang does not explicitly disclose developing a Bayesian network model that represents a computer cluster (communication network) and nodes based upon the information in an event log and a system parameter log.

Chirashnya, in a similar field of endeavor, discloses developing a Bayesian network model that represents said computer cluster and said nodes based upon the information in an event log (fig.1, 32 & fig. 2, 40) and a system parameter log (fig. 2, element 44, [0052 & 0061]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made, to utilize the teachings of Chirashnya in Liang, to help create models for predicting and controlling future system performance and critical events. One of the ordinary skill in the art would have been motivated to utilize the teachings of both Liang and Chirashnya to facilitate a reliable collaboration for future events that could occur on a system.

Regarding **Claim 5,** filtering said event log and said system parameter log such that some critical event information and some system parameter information is not maintained in said event log and said system parameter log (Chirashnya: [0051]).

Regarding **Claim 6**, using a time-series mathematical model (e.g. probability distribution over time function) to predict future values of said system parameters (Chirashnya: [0009 & 0012]).

Regarding **Claim 17**, the combined teachings of Liang/Chirashnya disclose an information processing system comprising:

a computer cluster having a series of nodes (Liang: computing device, col.2, lines 1-2);

a control system for monitoring critical events that occur in said computer cluster and system parameter of said nodes (Liang: col.6, lines 37-41);

a memory (storage) for storing information related to said occurrence of said critical events and said system parameters of said nodes (Liang: col.6, lines 16-41, fig.3, 206); and

a Bayesian Network model for predicting a future occurrence of a critical event based upon an observed relationship between said system parameters and said occurrence of critical events (Chirashnya: [0009 & 0012]).

Regarding **Claim 18**, the filter for removing redundant information from said stored information (Chirashnya: [0051]).

Regarding **Claim 21**, the combined teachings of Liang/Chirashnya discloses wherein comprising a dynamic probe generator (monitoring module) for determining when to collect additional information concerning said system parameters or said critical event occurrence (Liang: col.5, lines 5-13, & col.6, lines 24-30).

5. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Liang in view of Castelli et al. (US. 2003/0023719) (referred herein after as Castelli).

Regarding **Claim 8**, Liang further teaches forming a warning window that

contains a critical event occurrence (e.g., generated message to notify the owner of the server in which the sampled parameter is received and is beyond the predefined range) (Liang: col.6, lines 48-52).

However, Liang does not explicitly disclose that said warning window contains a predicted performance parameter for the node for a predetermined future period of time.

Castelli, in a similar field of endeavor, such as prediction of computer system or network performance, discloses the step of predicting ([0012]) comprises forming a warning window (e.g., for displaying data such as a configuration data or graphical data by the monitoring and displaying facility/user-interface [0044-0046], and 104 of fig. 2) for each node in the cluster such that said warning window contains a predicted performance parameter (e.g., prediction is displayed [0045 & 0055-0056], and 107 of fig. 1) for the node for a predetermined future period of time (e.g., the expected values of the prediction parameters at each future time instant ([0067]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made, to utilize the teachings of Castelli in Liang, to be able to collect data for a future period of time, and not be limited only to present and historic data. One of the ordinary skill in the art would have been motivated to utilize the teachings of both Liang/Castelli, to allow the user of the system to be able to be able to analyze a predicted performance parameter or critical event occurrence on the system.

6. **Claims 9-16, and 19-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Liang in view of Chirashnya in further view of Harrop (US. 7,225,250) (referred herein after as Harrop).

Regarding **Claim 9**, Liang discloses a method of improving the performance of a computer cluster having a series of nodes comprising:

monitoring the occurrence of critical events (e.g., parameters are off a predefined range) in said nodes in said computer cluster (Liang: col.6, lines 37-41).

monitoring system performance parameters of said nodes in said computer cluster; (Liang: server 114 of fig. 1A & col.4, lines 37-41, col.5, lines 20-30).

Liang does not explicitly disclose creating a node representation for each node in said computer cluster based upon said monitoring;

creating a cluster representation based on said node representations;

periodically examining said node representations to predict future node performance;

Chirashnya, in a similar endeavor, such as proactive on-line diagnostics to improve computer cluster performance, discloses a method for creating a node representation for each node in said computer cluster (e.g., system model that updates the configuration database which describes the modules that are used in the network) based upon said monitoring (e.g., complete configuration is updated in configuration database automatically in real time, based on which modules are

available, their status, and topology to reflect any changes that occur with each of the nodes in the network, Chirashnya: [0051], and element 44 of fig. 2);

creating a cluster representation (e.g., Bayesian Network, element 70 of fig. 4) based on said node representations constructs (e.g. a diagnostic engine constructs (fig.2,48) a cluster representation, in response to an observed critical occurrence (e.g., unsolicited data as indicated by an alarm (element 71 of fig. 4).

Building the cluster representation, the diagnostic engine, begins with the nodes corresponding to the observed alarm, and the fault that caused the alarm, Chirashnya: [0065-0068]);

periodically (whenever an alarm or sequence of alarms is received from the network, Chirashnya: [0010]), examining said node representations to predict future node performance (Bayesian Network, that updates and predicts the probability of failure of a given device on a network, Chirashnya: [0009]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made, to utilize the teachings of Chirashnya in the method of Liang, to allow the users of the system to automatically identify the most probable system malfunctions that would occur on a network and to proactively maintain system reliability.

However, Liang and Chirashnya do not explicitly disclose using said cluster representation to redistribute tasks among said nodes based upon said predicted node performance.

Harrop, in a similar field of endeavor, discloses a method of resource management in a network, comprising in the steps of predicting whether a

performance problem within a network or network element is likely to occur (col.14, lines 61- 67 & col.15, lines 1-27).

Harrop further teaches where a responsive action to be taken in response to a predicted failure is to reallocate tasks to other resources available on the network (col.15, lines 47-51).

One of the ordinary skill in the art, would appreciate that the reallocation of tasks on a network would help maintain redundancy on a network. In practicing the method of Liang/Chirashnya, wherein cluster representation is used to predict future node performance, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to reallocate system tasks based upon a predicted performance problem (e.g., predicted node performance) as taught by Harrop, in being able to have a proactive solution to possible future malfunctions that could occur in the network by reallocating tasks accordingly to the resources that are available on the network.

Regarding **Claim 10**, this method claim comprises limitation(s) substantially the same, as those discussed on claim 2 above, same rationale of rejection is applicable.

Regarding **Claim 11**, saving information concerning said critical events and said system performance parameters in a database (Liang: col. 2, line 21).

Regarding **Claim 12**, filtering said saved information to remove information

wherein said removed information is not determined to be useful in predicting a future performance of said nodes (Chirashnya: [0051]).

Regarding **Claim 13**, applying a time-series mathematical model (e.g. probability distribution over time function) to said system performance parameters to predict future values of said system performance parameters (Chirashnya: [0009, 0012 & 0026]).

Regarding **Claim 14**, wherein said time series mathematical model is a moving average (mean) (Chirashnya: [0054]).

Regarding **Claim 15,** using rule based classifications to associate some system performance parameters with occurrence of said critical events (Liang: col. 8, lines 21-35, col. 6, lines 27-30, elements 504 & 510 of Fig. 5)

Regarding **Claim 16**, wherein said system performance parameters concern at least one of a node temperature (Liang: element 402 of fig. 6, & col. 6, lines 43-48, & 59-61).

Regarding **Claim 19**, wherein said Bayesian Network comprises a time-series modeler for predicting future values of said system parameters (Chirashnya: using a time-series mathematical model (e.g. probability distribution over time function) to predict future values of said system parameters (Chirashnya: [0009 &

0012]).

Regarding **Claim 20**, wherein said Bayesian Network comprises a rule based classification system for associating said parameter with said occurrences of said critical events (Liang: col. 8, lines 21-35, col. 6, lines 27-30, elements 504 & 510 of Fig. 5).

7. **Claim 4,** is rejected under 35 U.S.C. 103(a) as being unpatentable over Liang as applied to claim 1, in view of Odhner (US 6,862,623) (referred herein after as Odhner).

Regarding **Claim 4**, although the applied references do teach recording parameters of a node in a cluster and a timestamp as discussed above, where further the node may include various types of computers (Liang: col.12, lines 54-57); Although Liang does suggest that those skill in the art may add other parameters (Liang: col.5, lines 24-30).

The combined teachings of Liang and Chirashnya does not explicitly disclose wherein maintaining said system parameter log comprises recording particularly a utilization parameter of a central processing unit of a node in the cluster and a corresponding time value.

Odhner, in a similar field of endeavor such as capacity planning, discloses recording a utilization parameter of a central processing unit of a node in the cluster (col.1, lines 53-58, screenshot of processor utilization on Fig. 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made, to utilize the teachings of Odhner in Liang/Chirashnya to help manage redundancy in the system. One of the ordinary skill in the art would have been motivated to utilize the teachings of both Liang/Chirashnya and Odhener to have a redundancy controlled system to help manage the different conditions of the system.

Other Pertinent Prior Art

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A. Chakravarti et al. (US 7,007,084) discloses a proactive predictive preventive network management technique.

B. Liu et al. (US 5,031,089) discloses a dynamic resource allocation scheme for distributed heterogeneous computer systems.

C. Shurmer et al. (US 5,974,237) discloses a method of monitoring a communications network.

D. Ballantine et al. (US 6,446,123) discloses a tool for monitoring health of networks.

E. Anderson (US 2002/0174217) discloses a system and method for predicting network performance

E. Brockwell et al. (Introduction to Time-Series and Forecasting, 2nd Edition) discloses methods and techniques of time-series and forecasting as applied in economics, engineering, and natural and social sciences.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Mejia whose telephone number is 571-270-3630. The examiner can normally be reached on Mon-Thur 7:30AM-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Beatriz Prieto can be reached on 571-272-3902. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Mejia, Anthony
Patent Examiner

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SUPERVISORY PATENT EXAMINER